



Intel® Performance Library Suite

Do you want to boost the performance of your applications by taking advantage of the latest features of Intel® processors? Would you like to make your software really scalable, even though you can't afford time-consuming assembly-level optimization?

Intel® Performance Library Suite has the solution for you.

The Suite includes libraries covering a wide variety of application areas:

- Intel Math Kernel Library
- Intel Signal Processing Library
- Intel Recognition Primitives Library
- Intel Image Processing Library
- Intel JPEG Library

Each library contains highly optimized hand-coded routines for performing many compute-intensive tasks in the respective area. The libraries can automatically detect the type of processor in the user's computer and load processor-specific DLLs for optimal performance.

Intel® Math Kernel Library

The Intel Math Kernel Library is a set of highly optimized routines for solving problems of computational linear algebra and for performing the fast Fourier transform (FFT).

The library includes the following groups of routines:

- BLAS – Basic Linear Algebra Subprograms (Fortran interface)
 - BLAS Level 1 (basic vector operations)
 - BLAS Level 2 (basic matrix-vector operations)
 - BLAS Level 3 (basic matrix-matrix operations)
- CBLAS (C interface to the BLAS package)
- Extended BLAS for performing vector operations on sparse vectors (Fortran interface)
- FFT routines (Fortran and C interfaces)
- LAPACK package (Fortran interface):
 - computing matrix factorizations
 - solving systems of linear equations
 - estimating condition numbers
 - matrix inversion
 - solving symmetric, non-symmetric, and generalized eigenvalue problems
 - computing the singular-value decomposition (SVD)

LAPACK and BLAS Level 3 routines of the Math Kernel Library can implement parallel computation and are especially beneficial when run on multiprocessor workstations.

Intel® Signal Processing Library

The Intel Signal Processing Library provides you with a set of C-callable signal processing functions optimized for Intel processors. The library functions are similar to those available for digital signal processors (DSPs). With these functions, you can develop better signal-processing solutions, potentially eliminating the need for specialized DSPs.

The library includes the following groups of functions:

- vector operations: arithmetic, logical, threshold, square root, standard deviation, exponential, power spectrum functions
- windowing functions: Bartlett, Blackman, Hamming, Hann, and Kaiser windows
- discrete transforms: DFT, FFT, DCT, wavelet transforms
- filter functions: finite impulse response (FIR) filters, infinite impulse response (IIR) filters, least-mean-square adaptive filters
- filter design functions
- sample generation: pseudo-random, uniform, and Gaussian samples
- correlation functions: cross-correlation; normal, biased, and unbiased autocorrelation
- convolution: one- and two-dimensional functions

Intel® Recognition Primitives Library

The Intel Recognition Primitives Library includes C functions that perform various low-level operations frequently used in speech- and character-recognition software. The library functions feature assembly-level optimization, which helps your application harness the performance of the latest generations of Intel processors.

The library contains the following groups of functions:

- speech-specific signal processing: pre-emphasis and cepstral analysis
- Mahalanobis distance, Gaussian mixtures
- multi-layer perceptron (MLP) functions
- clustering and vector quantization functions
- Kohonen networks
- dynamic time warping
- hidden Markov models: Viterbi, Baum-Welch, and forward algorithms
- speech-specific signal processing: pre-emphasis and cepstral analysis

Intel® Image Processing Library

The Intel Image Processing Library provides C/C++ programmers with image-processing functions that are commonly required by desktop publishing, machine vision, digital video, image compression and image printing applications.

Image Processing Library functions have a convenient high-level programming interface. An image's characteristics are encapsulated in a flexible image structure.

The library includes the following groups of functions:

- arithmetic and logical operations
- alpha-blending functions
- filtering: Prewitt, Sobel, Laplacian, minimum, maximum, median filters, and more
- general 2D convolution
- transforms: fast Fourier transform (FFT) and discrete cosine transform (DCT)
- morphological operations: erosion, dilation and their combinations

- converting RGB images to and from HLS, HSV, CIELAB (XYZ), CIELUV, YUV, and YCrCb color models
- gray-to-color, color-to-gray, bitonal-to-gray, and other bit-depth conversions
- applying color twist matrices
- comparing and thresholding images
- contrast stretching, computing and equalizing image histograms
- image norms, relative errors, and moments
- geometric transformations: zoom, decimate, rotate, mirror, shear; affine, bilinear, and perspective transforms
- image re-mapping with user-defined coordinate transformations

The Image Processing Library features processor-specific optimization. The library optimizes performance on processors with MMX™ technology, as well as on the latest generations of Intel processors.

Intel® JPEG Library

The Intel JPEG Library is a C/C++ software library for high-performance encoding and decoding of full-color or grayscale, continuous-tone still images in JPEG format.

The library uses the following input/output data structures:

- general pixel buffer in memory
- standard input/output file that contains a baseline or extended baseline JPEG bit stream
- memory buffer that contains a Baseline or Extended Baseline JPEG bit stream

The library supports these architectural features:

- top-down or bottom-up pixel buffers
- pixel buffers with user-defined end-of-line padding
- rectangles-of-interest within a general pixel buffer or a larger JPEG image
- encoding and decoding images in JPEG File Interchange Format (JFIF) version 1.02
- support for 8-bit data sample values per color channel

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